

## **HEMI-SYNC® SOUNDS FOR SYNCHRONIZING BRAINS OF HORSES**

*by Helene N. Guttman, PhD*

*Helene Guttman has had a diverse education, with each advanced degree in a different field. She is now employed as the animal care coordinator in the Agricultural Research Service, USDA, and is active in varied metaphysical pursuits. Her extensive publications in biomedical areas include several on brain peptides that influence behavior. Here, Dr. Guttman discusses the results of her field experiments.*

### **BACKGROUND**

Virtually all documented studies on the use of sound to modify behavior have been done using human subjects. These studies include a wealth of biomedical reports in the scientific literature and others published in magazines and books aimed at a more general audience. When working with human subjects, one usually gathers oral, subjective reports from the subject either during or after the experience. Sometimes it is useful to attach the subject to equipment that measures physiological reactions to determine whether subjective reports correlate with one or more physiological patterns.

Farmers in many countries reportedly play music in barns both to entertain the workers and to keep the animals happy and productive. Reports in the European scientific literature indicate that noxious noises (that people consider noise pollution) appear to have negative effects on animals: for example, reduction in milk production or increase in levels of the so-called stress hormones. There are no reports of controlled experiments attempting to correlate changes in patterns of animals' brain waves with the onset or cessation of sound stimuli.

### **INTRODUCTION TO OUR STUDY**

The study described here was the first step in determining if animals other than humans respond to Hemi-Sync signals by synchronizing the electroencephalographic (EEG) output of the left and right sides of their brains. More specifically: Do horses (our chosen test species) respond to Hemi-Sync signals with brain synchronization, and if yes, can we visualize this phenomenon using inexpensive, noninvasive, portable (battery operated) equipment that would not interfere with an animal's normal habits and behavior?

To answer this question, we administered two types of prerecorded sounds to a horse: (1) a control tape that is devoid of Hemi-Sync sounds, and (2) an experimental tape that sounds like the control but has Hemi-Sync signals embedded under the control sounds. We selected as

the control music that the subject horse appeared to like, based on our observations of his responses.

## **PLANNING EXPERIMENTS: SOME PRECAUTIONS**

### *Blinding the Investigator to the Type of Treatment Administered*

It is important to eliminate the possibility that an investigator will expect a particular result, and thereby unconsciously influence the experiment to obtain those results. For example, in the now-classic report on maze learning in rats (Markowitz and Sorrells 1969), the experimenters divided a litter of inbred rats into two groups and told the investigator that one group was derived from a line of slow learners and the other from a line of fast learners. The result was that rats from the group thought to be fast learners performed well, while rats from the other group performed poorly.

### *Administering Experimental Sounds to Animals*

Headphones or stereo speakers are useful vehicles for exposing animals to the music tapes. For the experiments described here, we used a stereo tape player. If headphones had been used, it would have been important to position them at least an inch from the horse's ears.

We used a music tape developed by the composer to fit the tempo of fifty to seventy beats per minute with a regular rhythm: this rhythm has been found to promote relaxation and enhance learning and retention skills in humans. The Hemi-Sync signals were embedded under the music so that we human experimenters could not hear the difference between the control tape and the Hemi-Sync tape. The control and the experimental tapes were coded; the key to the codes was not given to me until after the experiment was completed.

In his theoretical perspective of the Hemi-Sync process, Atwater (1988) noted that the frequencies at which binaural beats can be detected change depending upon the size of the cranium, and that the distance between the ears influences how the brain perceives the signal. Horses, compared with humans, have much bigger heads and thicker skulls, but have much smaller brains (about the size of a grapefruit).

### *Administering Sounds to Horse Subjects*

Our first experiments (reported here) were geared only to determining whether we could find conditions that would result in synchronizing the brains of horses. Each experiment session was forty-five minutes long.

### *Determining Whether Exposure to Hemi-Sync Synchronizes a Horse's Brain*

All experiments were recorded on videotape, with the time and date marked on each frame and the sound track active. The subject horse was fitted with a battery-operated, simplified four-channel EEG HAL-4, modified so that it could (a) store the data on a buffer device, and (b) be turned on and off remotely. The entire equipment apparatus was packed into a plastic carrying case that was strapped to the horse where a saddle ordinarily would go. The electrodes were secured to a card affixed with Velcro to a horse bonnet. Electrical contact with the horse's head was assured for each electrode by first clipping the horse's forehead hair over the brain location and then coating the electrode contact sites with electrical conducting jelly. The electrodes were connected to the modified HAL-4 by cables.

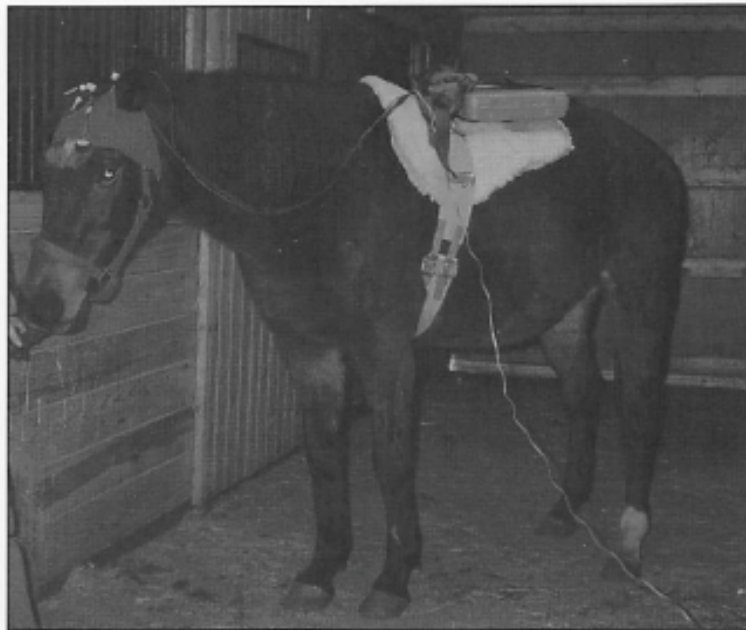
After the experiments were concluded, the data was downloaded from the buffer and stored on three-and-one-half-inch computer floppy disks for later analysis. Analysis consisted of using the HAL-4 software program to convert the EEG squiggles into an equivalent series of changing bar graphs by a mathematical process called fast Fourier transform (FFT). The bar graphs displayed a simultaneous graphic presentation of both the left and right sides of the horse's brain over the range of frequencies we monitored (four to twenty Hz) during the entire course of our experiment. This enabled us to observe whether stimulus with Hemi-Sync synchronized the brain of our horse.

## **CONCLUSION**

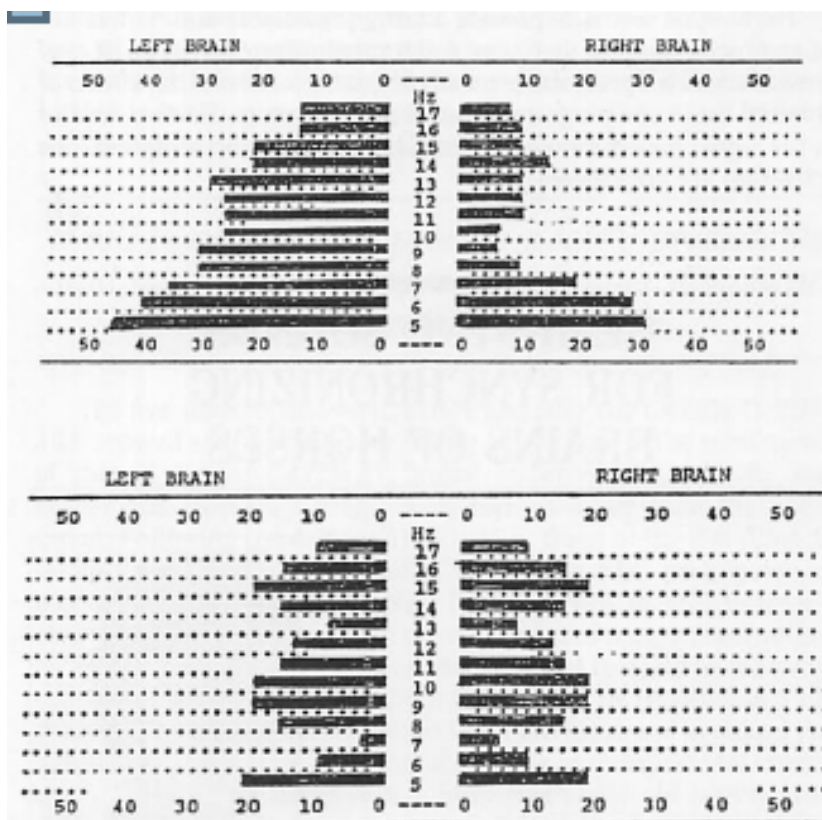
Reported here is the first evidence that the same types of Hemi-Sync that synchronize human brains can also synchronize horse brains.

This first horse study suggests several future uses for Hemi-Sync with equines, including (a) stress reduction during travel; (b) calming followed by attentiveness and alertness before races and horse shows; (c) enhancement of sleep and rest periods; (d) environmental enrichment in their quarters. Of course, the use of brain monitoring is ancillary to the important, visible behavioral effects of Hemi-Sync on humans and animals. However, such monitoring is a research tool that assists us in understanding the mechanism of the underlying events.

Under development now is BRAIN LINE 1, a battery-operated remote-controlled replacement for the modified HAL-4, which will capture EEGs in the frequency range of one to thirty Hz from four brain sites, store the EEGs, analyze brain output from each left and right pair independently, and fast Fourier transform the EEGs to bar graphs on a personal computer. The equipment will have the capacity of simultaneously following physiological processes, and will include a switch for operating a cassette player remotely.



*Monitoring equipment was strapped to the subject horse's back with connecting cables to electrodes secured to the forehead.*



*FFT bar graphs showing right- and left-brain activity before (above) and after (below) Hemi-Sync introduction.*

Hemi-Sync® is a registered trademark of Interstate Industries, Inc.  
© 1991 The Monroe Institute